

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
 US Department of Commerce  
 United States Patent and Trademark  
 Office, PCT  
 2011 South Clark Place Room  
 CP2/5C24  
 Arlington, VA 22202  
 ETATS-UNIS D'AMERIQUE  
 in its capacity as elected Office

Date of mailing (day/month/year) 14 June 2001 (14.06.01)	
International application No. PCT/NL00/00696	Applicant's or agent's file reference P51173PC00
International filing date (day/month/year) 29 September 2000 (29.09.00)	Priority date (day/month/year) 30 September 1999 (30.09.99)
Applicant ZHARKOV, Alexandr Sergeevich et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

28 March 2001 (28.03.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Zakaria EL KHODARY Telephone No.: (41-22) 338.83.38
---	--

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT PCT

(PCT Article 36 and Rule 70)

REC'D 29 JAN 2002

W/200 PCT

Applicant's or agent's file reference <b>P51173PC00</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/NL00/00696</b>	International filing date (day/month/year) <b>29/09/2000</b>	Priority date (day/month/year) <b>30/09/1999</b>
International Patent Classification (IPC) or national classification and IPC <b>C06B23/02</b>		
Applicant <b>ALTAI FEDERAL RESEARCH AND PRODUCTION ORGANISATION</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand <b>28/03/2001</b>	Date of completion of this report <b>28.01.2002</b>
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer <b>Schut, R</b> Telephone No. +31 70 340 3293 

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL00/00696

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

### Description, pages:

1-12 as originally filed

### Claims, No.:

2-15,17-21 as originally filed

1,16 as received on 28/11/2001 with letter of 28/11/2001

### Drawings, sheets:

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL00/00696

- ☐ the description,      pages:
- ☐ the claims,      Nos.:
- ☐ the drawings,      sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## **V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

### **1. Statement**

Novelty (N)	Yes:	Claims	1-21
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-21
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-21
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

The following documents are mentioned for the first time in this written opinion; the numbering will be adhered to in the rest of the procedure:

- D1: DE-A-3316529 (ERNO Raumfahrttechnik GmbH)
- D2: DE-A-4318883 (TRW Inc.)
- D3: US-A-5495819 (F.A. Marion)
- D4: EP-A-767155 (Morton International, INC.)
- D5: WO-A-9640541 (TAKATA MOSES LAKE, INC.)
- D6: DE-A-19819623 (Dynamit Nobel GmbH Explosivstoff- und Systemtechnik)
- D7: US-A-4758287 (J.F. Pietz)
- D8: Derwent Abstract no. AN=1998-554999. Abstract of  
RU 2108282 C (ALTAI SCI PRODN ASSOC) (1998-04-10)

**1) Novelty**

**Independent product claim 1**

1a) D1 (see D1; claim 4 and page 3, lines 18-21) discloses a gas generator comprising a mixture of pure sodium azide granules, (i.e., first bodies) and pure sulphur granules (i.e., second bodies). The sulphur granules will generate the sulphur as sulphur vapour, (i.e., neutralisation agent) upon heating by the combustion gases of the sodium azide granules. The sulphur vapour will subsequently react with the sodium generated upon combustion of the sodium azide granules. Amended claim 1 is novel over D1 as the sulphur granules and the sodium azide granules are not spatially separated.

1b) D2 (see D2; col. 13, line 55 to col. 14, line 25 and claim 5) discloses a gas generator with tablets comprising a fast burning layer and a slow burning layer. The slow burning layer (i.e., first body) comprises an azide and iron oxide and the fast burning layer (second body) comprises an azide and copper oxide. The molten copper oxide generated by combustion of the fast burning layer (i.e., the first body) is captured (neutralized) by the solid iron oxide (i.e., neutralisation agent) generated by the slow burning layer (i.e., the second body). Amended claim 1 is novel over D2 as the fast burning layer and the slow burning layer are not spatially separated from each other.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/NL00/00696

1c)D3 (see D3;claim 1) discloses a gas generator comprising an exothermic means (i.e., a first body) generating gas and an endothermic means (i.e., a second body) generating a neutralisation agent upon combustion of the first body, which converts the gases produced by the first body into gases providing no visible indications in water and air. Amended claim 1 is novel over D3 as the neutralisation agent generated by the endothermic means does not pass through the exothermic means.

1d)The present application does satisfy the requirements of Article 33(2) PCT because the subject matter of independent product claim 1 and independent process claim 16 is novel in view of D1 to D8 belonging to the prior art as defined in the regulations (Rule 64(1) PCT).

2)Inventive step

Amended independent process claim 16

2a)D2 (see D2; claim 11) discloses a process for generation of nitrogen comprising the steps of:

- decomposition of a solid material in a fast burning layer (i.e., a first body), whereby gas and molten material (i.e., other reaction products) are generated at a decomposition front;
- generating a gas and a solid slag material (i.e., a neutralisation agent) in a slow burning layer (i.e., a second body);
- capturing (i.e., neutralising) the molten material (i.e., the other reaction products) in the first body by reaction with the neutralising agent;
- maintaining a temporal and/or spatial interval between the decomposition front of the first body and a neutralisation front obtained by passing the neutralisation agent from the second body into the first body.

2a2)The difference between the subject matter of amended claim 16 and the process disclosed in D2 is that the solid material of the first body is porous, the second body is spatially separated from the first body, the neutralisation agent is passed through said first body and that gas generated by the gas-penetrable porous solid material is passed

through said porous solid material.

2a3) Passing the gas generated by the gas-penetrable porous solid body through said porous solid body is known from D8 (see D8;abstract). Furthermore it is well-known to enhance the burning rate of gas generating bodies by increasing the porosity of the gas generating body.

2a4) It appears not to be possible to anticipate the process of amended independent process claim 16 of the present application by a logical combination of D1, D2, D3 and/or D8. Therefore the subject matter of independent process claim 16 does satisfy the requirements of the presence of an inventive step (Article 33(3) PCT).

Amended independent product claim 1

2b) The cited prior art documents D1 to D8 do not disclose spatially separated bodies as defined in amended product claim 1 of the present application, whereby the neutralisation agent generated by the second body is passed through the first body. It appears not to be possible to anticipate the product of amended product claim 1 of the present application by a logical combination of the prior art represented by D1 to D8. Therefore the subject matter of claim 1 does satisfy the requirements of the presence of an inventive step in view of the prior art represented by D1 to D8 (Article 33(3) PCT).

3) Dependent claims

3a) Dependent claims 2-15 and 17-21 comprise additional technical features, which in combination with the corresponding independent claim represent novel and inventive subject matter and therefore satisfy the requirements of Articles 33(2) and (3) of the PCT.

EPO - DG 1

28. 11. 2001

New Page 13

99

Amended claims

1. Gas generator comprising at least one first body, comprising means for the generation of gas and one or more reaction products, and at least one spatially separated second body, comprising means for the generation of a neutralisation agent, wherein means are present for ~~contacting the~~ passing said neutralisation agent ~~with~~ through the said first body, to neutralise one or more reaction products - such as slag - from the generation of gas in the said first body, and wherein means are present for operating the generation of a neutralisation agent in the second body at a ~~temporal and/or~~ spatial interval and optionally a temporal interval from the generation of gas in the first body.

10

Claims 2-15 are unaltered.

16. Process for the generation of gases, preferably nitrogen, comprising the steps of:
- 15 - decomposition of a gas-penetrable porous solid material in a first body, whereby gas and other reaction products are generated at a decomposition front;
- passing the gas through said porous solid material;
- generating a neutralisation agent in a second body, wherein the
- 20 second body is spatially separated from the first body;
- passing the neutralisation agent through said porous solid material;
- neutralising the said other reaction products in the first body by reaction with the neutralisation agent;
- maintaining a temporal and/or spatial interval between the
- 25 decomposition front of the first body and a neutralisation front obtained by passing the neutralisation agent from the second body into the first body.



New page 14

Claims 17-21 are unaltered

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 00/00696

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C06B23/02 C06B23/04 C06B45/00 C06D5/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C06B C06D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

COMPENDEX, WPI Data, EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 767 155 A (MORTON INTERNATIONAL, INC.) 9 April 1997 (1997-04-09)	1
Y	page 3, line 14 - line 47 page 5, line 9 - line 30; claims	2-21
Y	US 4 758 287 A (J.F. PIETZ) 19 July 1988 (1988-07-19) column 10, line 14 - line 30 column 11, line 21 - line 35; claims	2-16, 19-21
X	DE 33 16 529 A (ERNO RAUMFAHRTTECHNIK GMBH) 8 November 1984 (1984-11-08)	1
Y	page 4, line 25 - line 26; claims	2,4-15
A	DE 32 38 465 A (ERNO RAUMFAHRTTECHNIK GMBH) 3 May 1984 (1984-05-03) claims	1,16
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*Z\* document member of the same patent family

Date of the actual completion of the international search

26 January 2001

Date of mailing of the international search report

05/02/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Schut, R

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/NL 00/00696

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 2 184 719 A (YEDA RESEARCH AND DEVELOPMENT COMPANY LIMITED.) 1 July 1987 (1987-07-01) page 1, line 45 - line 95; claims ----	5, 16, 18
X	DE 198 19 623 A (DYNAMIT NOBEL AG) 5 November 1998 (1998-11-05) claims ----	1
Y	DE 39 35 869 C (BAYERN-CHEMIE GESELLSCHAFT FÜR FLUGCHEMISCHE ANTRIEBE MBH) 18 July 1991 (1991-07-18) page 2, line 39 - line 65; claims ----	4-7
Y	DE 39 35 869 C (BAYERN-CHEMIE GESELLSCHAFT FÜR FLUGCHEMISCHE ANTRIEBE MBH) 18 July 1991 (1991-07-18) page 2, line 39 - line 65; claims ----	4-7, 16
Y	US 3 741 585 A (R.R. HENDRICKSON ET AL.) 26 June 1973 (1973-06-26) cited in the application claims ----	4-7, 16
A	WO 96 40541 A (TAKATA MOSES LAKE, INC.) 19 December 1996 (1996-12-19) page 9, line 4 - line 16; claims ----	1, 16
X	DE 43 18 883 A (TRW INC.) 9 December 1993 (1993-12-09) column 13, line 55 - column 14, line 41 ----	1
Y	US 5 495 819 A (F.A. MARION) 5 March 1996 (1996-03-05) column 3, line 40 - column 4, line 52 column 7, line 17 - column 8, line 28; claims ----	16
X	US 5 495 819 A (F.A. MARION) 5 March 1996 (1996-03-05) column 3, line 40 - column 4, line 52 column 7, line 17 - column 8, line 28; claims ----	1, 16
X	US 4 630 539 A (L.B. THORN ET AL.) 23 December 1986 (1986-12-23) column 3, line 14 - line 32; claims ----	1, 16
L	CHEMICAL ABSTRACTS, vol. 132, no. 7, 12 February 2000 (2000-02-12) Columbus, Ohio, US; abstract no. 80495x, V.A. SHANDAKOV ET AL.: "Cold gas generators multiple use in hazardous situations" page 845; XP002140538 abstract & NATO Sci. Ser., I 1999, 26(Prevention of Hazardous Fires and Explosions), 341-346 ----- -/-	1, 16

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 00/00696

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
L	CHEMICAL ABSTRACTS, vol. 132, no. 1, 3 January 2000 (2000-01-03) Columbus, Ohio, US; abstract no. 4539z, A.M. TELEGATOR ET AL.: "Ignition analysis of a porous energetic material: II. Ignition at a closed heated end." page 525; XP002140539 abstract & COMBUST. THEORY MODELL., vol. 3, no. 3, 1999, pages 433-445, -----	1,16
A	DATABASE COMPENDEX 'Online! ENGINEERING INFORMATION, INC., NEW YORK, NY, US; KOMAROV V F ET AL: "Propellants, their properties, and regions of application" Database accession no. EIX99464805134 XP002140540 abstract & FIZ GORENIYA VZRYVA;FIZIKA GORENIYA I VZRYVA MAR-APR 1999 MEZHDUNARODNAYA KNIGA, MOSCOW, RUSSIA, vol. 35, no. 2, March 1999 (1999-03), pages 30-34, -----	1,16
Y	DATABASE WPI Section Ch, Week 199847 Derwent Publications Ltd., London, GB; Class E36, AN 1998-554999 XP002140541 & RU 2 108 282 C (ALTAI SCI PRODN ASSOC), 10 April 1998 (1998-04-10) abstract -----	3,16,17

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Interr. .nal Application No

PCT/NL 00/00696

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 767155 A	09-04-1997	US 5670740 A DE 69609793 D DE 69609793 T JP 9118582 A	23-09-1997 21-09-2000 28-12-2000 06-05-1997
US 4758287 A	19-07-1988	DE 3820443 A FR 2616428 A GB 2205826 A,B IT 1226696 B JP 1052485 A JP 2824769 B	29-12-1988 16-12-1988 21-12-1988 04-02-1991 28-02-1989 18-11-1998
DE 3316529 A	08-11-1984	DE 3238465 A	03-05-1984
DE 3238465 A	03-05-1984	DE 3316529 A	08-11-1984
GB 2184719 A	01-07-1987	NONE	
DE 19819623 A	05-11-1998	BR 9808712 A CN 1253538 T WO 9850324 A EP 0979219 A	11-07-2000 17-05-2000 12-11-1998 16-02-2000
DE 3935869 C	18-07-1991	JP 3150285 A US 5064483 A	26-06-1991 12-11-1991
US 3741585 A	26-06-1973	NONE	
WO 9640541 A	19-12-1996	NONE	
DE 4318883 A	09-12-1993	JP 6048880 A US 5507890 A	22-02-1994 16-04-1996
US 5495819 A	05-03-1996	NONE	
US 4630539 A	23-12-1986	NONE	
RU 2108282 C	10-04-1998	NONE	